We have just witnessed a most enlightening discussion on intra-day volatility. It shows that the topic of this year’s Financial Markets Conference has been aptly chosen. Volatility is a topic that very closely concerns not only traders, but also us as operators of regulated markets. We have all been given a reminder of this by some truly dramatic trading days in the course of this year. In the second half of January, and again this month, the international equity markets experienced extremely large turnovers and considerable index movements, pushing the workload of our trading systems to their limits.

My opening address is organized around three major theses. Firstly, in recent years, exchange trading has undergone some major structural changes: trading has become more international, more competitive, and much faster. None of these macro trends, however, has a one-way relation to volatility. Each of them has the potential to either reduce or enhance volatility. Secondly, empirical evidence on Xetra, Deutsche Börse’s electronic cash market, seems to support the view that there is no definite long-term trend in the development of volatility. At the same time, however, it makes clear that volatility comes in seasonal peaks, and is a feature of markets we have to cope with in the long run: We have to live and therefore to deal with volatility. We are currently witnessing such a peak of a particularly high magnitude – and we have seen similar ones before in the past decade. And thirdly, exchanges’ market design can play an important role in dealing with volatility. Volatility interruptions may in this context turn out to be a relevant alternative to fully-fledged circuit breakers, since they do not interrupt the process of price discovery. This underlines the significance of the efforts undertaken by exchanges to improve market design and facilitate safe and orderly trading.
Regarding thesis number one: Volatility in January and again in recent weeks was, of course, exceptional due to external shocks. However, there are also a number of structural changes in the securities industry that may in the long run have an effect on market volatility. The trends I am referring to are, firstly, an increase in cross-border trading, secondly, an increase in competition between exchanges and alternative trading platforms, and, thirdly, an increase in algorithmic trading.

Firstly, cross-border securities trading has grown massively. In recent years, the major market participants worldwide have increasingly taken a global, cross-asset class perspective. On the exchange side, this development has been mirrored by two trends:

- On the one hand, regulatory change, especially in the EU, has further harmonized market regulation, and has thus eased cross-border market access. On a global scale, the dialogue on mutual recognition, especially between Europe and the US, will eventually make cross-border trading easier as well. Once issues of supervisory cooperation and investor protection have been sorted out, we will see trans-Atlantic and trans-Pacific trading taking place – not only via subsidiaries, but through direct remote access.

- On the other hand, a new wave of cross-border mergers of exchange operators has led to the emergence of a new group of global players competing on an international scale. Operators based in the US have entered the Western European market through major mergers. On the derivatives market, Deutsche Börse and Swiss Exchange subsidiary Eurex is now unified with the US options exchange ISE here in New York, led by David Krell. And the wave of acquisitions and cooperations is spilling over to markets in Eastern Europe, the Middle East, and Asia. With the further development of markets in these regions, especially in Asia, I am sure we will see cross-border acquisitions emerging from major players there as well.

The emergence of cross-border trading, if it creates larger liquidity pools, may have a dampening effect on volatility. However, we should keep in mind that so far this kind of cross-border consolidation mainly takes place on the level of exchange operators. Stock markets themselves are still largely national affairs, licensed and supervised by national authorities. In addition, the increasing interconnectedness of market operators may increase the speed by which trends in one market spread to others by further removing friction for exchange users pursuing their global trading strategies. As a consequence, volatility on the markets as a whole may increase.

A second trend worth pointing out here is an increase in competition for exchanges, mainly due to the emergence of new alternative trading
platforms. In the US, this trend goes back to the 1980s, when the first electronic communication networks and alternative trading systems were established. In Europe, where fully electronic exchange trading was introduced earlier than in the US and by the incumbent exchanges, such alternative platforms used to have little success and were usually dismantled only a few months after they had been established. However, recently they seem to be gaining wider acceptance. Instrumental for their emergence was the coming into force of the EU Markets in Financial Instruments Directive or MiFID in November last year. It has introduced the legal form of so-called multilateral trading platforms as a more lightly regulated alternative to exchanges.

At Deutsche Börse, we are monitoring this new competition closely. The largest MTF, Chi-X, so far has a market share in DAX 30 stocks of around ten percent. Volumes are, however, very volatile, and market depth is low. We also observe a strong positive correlation between trading volumes on Xetra and Chi-X. We believe that MTFs attract liquidity not from exchanges, but from OTC trading and previously internalized business, by targeting specific customer groups. Further to that, their activity results in increased arbitrage activities between platforms, including alternative platforms and incumbent exchanges, and therefore creates new trading volume for the whole market.

The effects such new markets may have on market stability are difficult to judge. On the one hand, they may contribute to a fragmentation of liquidity and thus increase volatility in single stocks. On the other hand, they may lead to an increase in arbitrage activities, and attract order flow that had so far been confined to the formerly opaque OTC market. In any case, I think the current situation underlines the role of exchanges as anchors of stability, providing access to liquidity, full transparency, stable trading systems, and clearing houses with central counterparties as functioning risk-management systems. In this context, I feel tempted to add that Deutsche Börse subsidiary Eurex Clearing is the only clearinghouse worldwide that is able to perform event-driven real-time risk management intraday.

Thirdly, algorithmic trading: At Deutsche Börse, the percentage of algo trading in overall trading volume has persistently increased in recent years, and has reached levels of above 40 percent now. Similar developments have taken place in exchange trading elsewhere as well. As a consequence, trading has become much faster, and the average size of orders has decreased. Arbitrage activities have been taken to a new level. For exchanges, the additional liquidity provided by algo trades is of course a welcome development. However, it also presents us with a major technological challenge: The requirements regarding system latency have massively increased.

This is the main reason why exchanges worldwide have been updating the performance of their electronic trading systems. On Xetra, for instance,
we have shortened the average order round trip time to almost one tenth of the levels of November 2006. The new dimension of speed has also made physical proximity an issue again. Algo traders at Deutsche Börse increasingly opt for using our co-location service in Frankfurt, close to the backend server of the trading system, in order to further decrease round trip times to an average of 7 milliseconds. The minimum we can reach has even come down to some 2 milliseconds.

I think it makes an interesting research topic to judge whether algorithmic trading increases or decreases volatility. On the one hand, it may amplify the swings of business cycles if it is behaving pro-cyclically. On the other hand, it adds to liquidity and should therefore have a dampening effect on volatility in single stocks. In addition, it monitors the market for signs of mis-pricing and by exploiting them for its trading re-aligns prices. This should also decrease volatility in single stocks.

Looking at empirical evidence, for example, during the very active and volatile trading days in January, we analyzed how algorithmic trading developed, and we observed that there was a strong correlation: selling activities by algorithmic traders coincided with a DAX decline and buying activities by algorithmic traders coincided with a DAX recovery. I am only talking of a strong correlation here, not of cause and effect – we have not studied the direction of the causal relation yet. In any case, the algos seem to have got their timing right, and come out of these days of market turmoil not with losses, but with gains.

As I said, I do not see any clear-cut and unambiguous causalities between the structural changes just outlined, and the direction volatility may take. I am confident, however, that the discussions we have been and will be having today will provide us with new insights concerning the causal links between such macro trends in global securities trading, and the volatility of markets. In any case, we will need to take a close look at the empirical evidence available in order to arrive at meaningful results. This brings me to my second thesis: Empirical evidence on Xetra, Deutsche Börse’s electronic cash market, seems to support the view that there is no definite long-term trend in the development of volatility. Volatility is a feature of markets we have to cope with in the long run.

At Deutsche Börse, we have had more than ten years of experience with electronic trading on the cash market side. This month in fact marks the tenth anniversary of Xetra as a fully fledged electronic trading system because it reached complete functionality with Release 3 in October 1998. I would like to take this opportunity to share some of this experience with you. My observations are of course only preliminary and intuitive. But maybe one of you feels encouraged to analyze these data in greater depth.

As you all know, volatility can be measured by two methods: firstly, by some statistical indicator for fluctuations, such as the standard deviation; and secondly, by calculating the implied volatility inherent in option prices.
Chapter 2: Opening Address: Reto Francioni

The former is a historical indicator, and measures actual price movements, the latter is forward-looking, and reflects the expectations of market participants. At Deutsche Börse, we compute the Volatility-DAX or VDAX, which presents implied volatility in an index form, and for which we have a time series available that goes back to 1992, as shown in Exhibit 6.

Exhibit 6 Volatility in DAX stocks traded at Deutsche Börse: 1992-2008

Looking at the VDAX in this time period, I would like to make three observations:

Firstly, a comparison of the former with the latter half of this time period suggests that the overall level of volatility seems to have increased slightly. Average volatility in the first half of this period stood at 20.5, and in the second half it reached 24.3. However, this is mainly due to an increase in short periods of exceptional volatility – it seems that there is no steady upward trend. At the same time, volatility has not declined to the levels we had experienced during the early 1990s, when, between 1992 and 1996, its average value had been 15.5. In other words: volatility is a feature of markets we have to live with – and we have to deal with.

Secondly, volatility comes in peaks and is induced by external shocks. However, in the short run, it does not seem to persist. After VDAX had reached the level of 63 in October 2002, it came down again to levels that were markedly lower than in the five years before: All through 2005 and 2006, VDAX remained in the range between 10 and 20, whereas the period between 1999 and 2001 had been characterized by levels between 20 and 30.

And thirdly, current levels of volatility, which at Deutsche Börse reached their all-time high of 64 on 10 October, are not unprecedented in terms of their general magnitude. We have seen levels of around or above 60 already twice during the past ten years. By saying this I do not mean to play down the severity of the current financial crisis. After all, the events that had led to such peaks in volatility were all very drastic external shocks to the world...
economy. Still, it may help to put things into perspective.

Exhibit 7  Xetra Order Book Trades 01/11/07 to 10/10/08: all-time highs on 22/01, 10/10, and 21/01. The turmoil days from 21 to 24 January and 7 to 10 October are among the most active days by number of trades on Xetra. High trading activity affected all instruments.

I will now go into some further detail of the developments induced by the current financial crisis this year until 10 October (Exhibit 7). In this period, we have seen two weeks with major losses: 20 to 24 January, and 6 to 10 October. On 21 January, the Asian markets led a major downturn, and were followed by the European markets when they opened. The DAX index for German blue chips plunged by more than 7 percent. In terms of market
capitalization, this meant a very substantial decrease for the DAX companies: Within one single trading day, they lost more than 50 billion Euro in value. On 10 October, DAX declined again in the same order of magnitude, losing up to nearly 12 percent during the day and closing with a minus of 7 percent.

On Deutsche Börse’s electronic trading system Xetra, 21 and 22 January and 10 October are the three trading days which registered all-time highs in terms of number of trades and executed orders. On 22 January, more than 1 million trades were registered – the absolute maximum seen so far, even if one counts the days of extreme market activity in September and October. The value of trading volumes, though, while reaching exceptionally high levels as well, did not react as strongly.

Exhibit 8 Development of VDAX 02/01/08 to 10/10/08. As expected, the index volatility, measured by the Volatility DAX, increased as stock market prices deteriorated in January. A similar development – stretched out over several days – can be observed during the September/ October 2008 market decline, where the VDAX marked a new all-time high on October, 10th.

These dramatic developments were mirrored by the Volatility-DAX (Exhibit 8). In January, the VDAX jumped from around 20 index points to nearly 40. Since then, it came down for a number of months, but has risen steeply again since mid-September to reach, as I said, an all-time high of 64 on 10 October. For us as exchange operators, one important message was the confirmation that Deutsche Börse’s systems were able to cope. And we were able to contribute to overall financial stability by providing the infrastructure
market participants needed to raise new liquidity and to re-evaluate their assets.

Apart from system stability, volatility confronts us as market organizers with yet another question: How can we maintain or even improve the conditions for fair, safe and orderly trading in an environment characterized by persistent volatility? What kind of safeguards can we introduce? How can we protect both investors and traders from the adverse effects of extreme volatility without compromising market efficiency? This brings me to the last section of my speech, and to my third thesis, which is:

Exchanges’ market design can play an important role in dealing with volatility. Volatility interruptions may in this context turn out to be an effective alternative to fully-fledged circuit breakers, since they do not interrupt the process of price discovery.

One common approach to dealing with volatility taken by exchanges has been the introduction of circuit breakers. There are three types of circuit breakers: price limits, which allow trading only within a certain price corridor; firm-specific trading halts, that apply to single stocks only; and market-wide trading interruptions. In 1988, the latter were embraced in the US by the Brady report as a consequence of the stock market crash of October 1987. Subsequently, they were introduced by the New York Stock Exchange. The costs and benefits of the various types of circuit breakers have been discussed extensively among regulators, exchange operators, and academics.

Proponents of circuit breakers argue that they prevent large price movements in times of market turbulence. They give brokers time to consult with their clients, and thus help to avoid panic reactions. By decreasing the risk of extreme adverse price movements, they also limit the margin requirements for market participants, and thus make trading less costly.

On the other hand, opponents of circuit breakers argue that, instead of making price discovery more rational, they merely put it off for later, and thereby also delay the distribution of information. As a consequence, volatility is not reduced, but only spread out over a longer period, or even increased. If this is the case, circuit breakers neither reduce risk, and therefore do not lower margin levels.

The argument is still undecided. Evidence from exchanges worldwide is, as usual, mixed and inconclusive. In any case, when designing Deutsche Börse’s electronic trading system Xetra, we decided against the introduction of market-wide circuit breakers. Instead, we installed a so-called volatility interruption. This functionality on Xetra combines price limits not with trading halts, but with a switch in the trading form of an individual instrument. Volatility interruptions have one important advantage in comparison to circuit breakers: they do not interrupt the price discovery process. As I said, they do not interrupt trading per se, but only continuous trading, and replace it by a call auction. The interruption of continuous
trading is triggered when a new price for a stock would be outside a pre-defined price range. It is in principle unknown to market participants, and different for each stock concerned.

By leaving the limit unknown, a voluntary interruption of continuous trading is avoided. The mechanism works like this: When the price limit is potentially crossed, all market participants are informed, and an auction is started with the order-book situation of that point in time. The auction concentrates liquidity, and the message sent to all market participants attracts further liquidity. This increase in liquidity in itself already improves the price discovery process. If strong price deviations persist after the auction, our market supervision desks contact the traders who have caused them. And in order to facilitate trading in a particularly volatile trading environment, the exchange management may also decide to introduce a so-called ‘fast market’ mode. In this mode, price corridors are widened under the assumption that the emergence of new information justifies stronger price movements. In addition, the exchange management may also stop trading in individual shares if major price-relevant news emerges.

Volatility interruptions are aimed especially at less liquid shares. They are, however, valid for all shares including our most liquid shares in DAX 30. On Xetra, we trade as many as 12,000 different financial instruments. As you can imagine, volatility interruptions are therefore quite frequent: On a normal trading day, we handle between 600 and 700 of them, mostly in illiquid shares. In our 30 most liquid DAX shares, we normally have less than ten volatility interruptions per trading day for all shares taken together. On exceptional trading days, such as those earlier this month, they can, however, also reach more than 100.

On the whole, volatility interruptions play an essential role in our efforts to guarantee smooth and orderly trading. We believe they are an effective way of dealing with situations of heightened volatility by allowing price discovery to continue and at the same time prevent a vicious circle of ever increasing price movements from taking place. We also find that they are an extremely useful method for avoiding mis-trades: Since potentially abnormal price movements automatically trigger volatility interruptions in advance, traders are routinely given an opportunity to correct any mistakes they might have made. As a consequence, so far in 2008, in spite of heavy trading activity in a difficult market environment, we have only registered three mis-trades on Xetra.

An extreme measure to stem volatility is currently being taken by regulators around the world in response to the most recent market turbulences: a temporary ban of short selling. In Germany, too, the financial regulator, BaFin, has followed the SEC’s lead and prohibited short selling in eleven financial stocks from 20 September to 31 December 2008. However, BaFin limited the ban to naked short selling. In addition market makers were exempted from this rule in order to enable them to fulfill their important role
as liquidity providers. I believe that in exceptional situations like the one we are just witnessing, such drastic measures as taken in Germany are justified in order to stimulate market confidence. However, three conditions are essential: they need to be coordinated internationally; they need to be limited to a fixed time period; and they need to be restricted to well defined circumstances. In Germany, this has so far been the case. As a matter of principle, however, I believe that short selling is an absolutely legitimate trading practice. It enhances liquidity and increase market efficiency. After all, there are also other, less severe options for coping with volatility.

To sum up: Volatility is an important challenge we all have to deal with, whether we are traders, regulators, organizers of exchanges – or academics testing new market microstructure models. We are currently experiencing a period of very high volatility. At the same time, the exchange industry is undergoing major structural changes on a global scale. Whatever the effect these changes might have on volatility, the design of markets by exchanges has been, is, and will remain of crucial importance – and while it cannot spirit away the causes of volatility by magic, it can still do wonders in helping to deal with it.

Ladies and gentlemen, I thank you for your attention and wish you a very good conference.
Volatility
Risk and Uncertainty in Financial Markets
Schwartz, R.A.; Byrne, J.A.; Colaninno, A. (Eds.)
2011, XVI, 137 p., Hardcover
ISBN: 978-1-4419-1473-6